

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Bernhardt 6G-403**

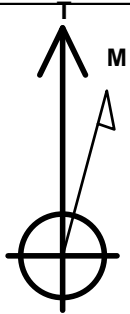
Surface Location: Bernhardt 4N66W6G Pad Sec.6-T4N-R66W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4722.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1367444.41	3187687.75	40.340080	-104.826690	
RKB - 15' WELL @ 4737.0ft (RKB - 15')						

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 2258'FSL & 863'FWL, Sec.6	1.0	0.0	0.0	Point
BHL 2164'FNL & 75FWL, Sec.7	7210.0	-4440.9	-780.7	Point



Azimuths to True North
Magnetic North: 8.46°

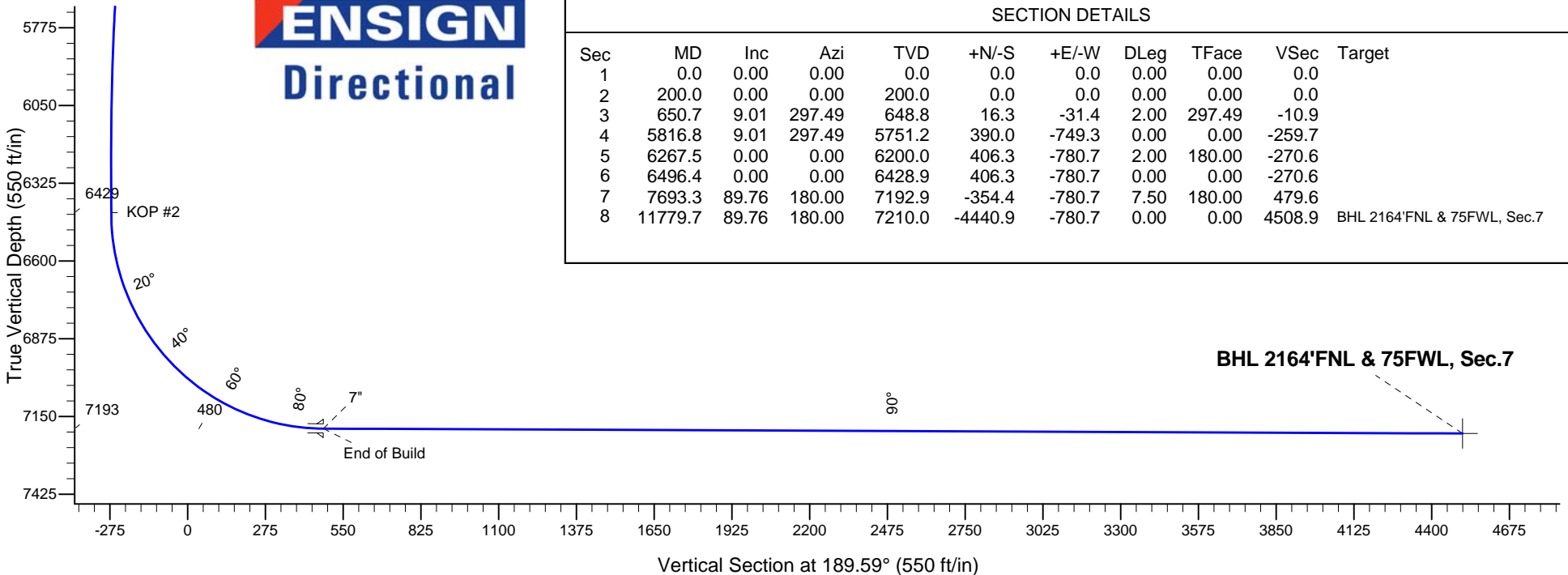
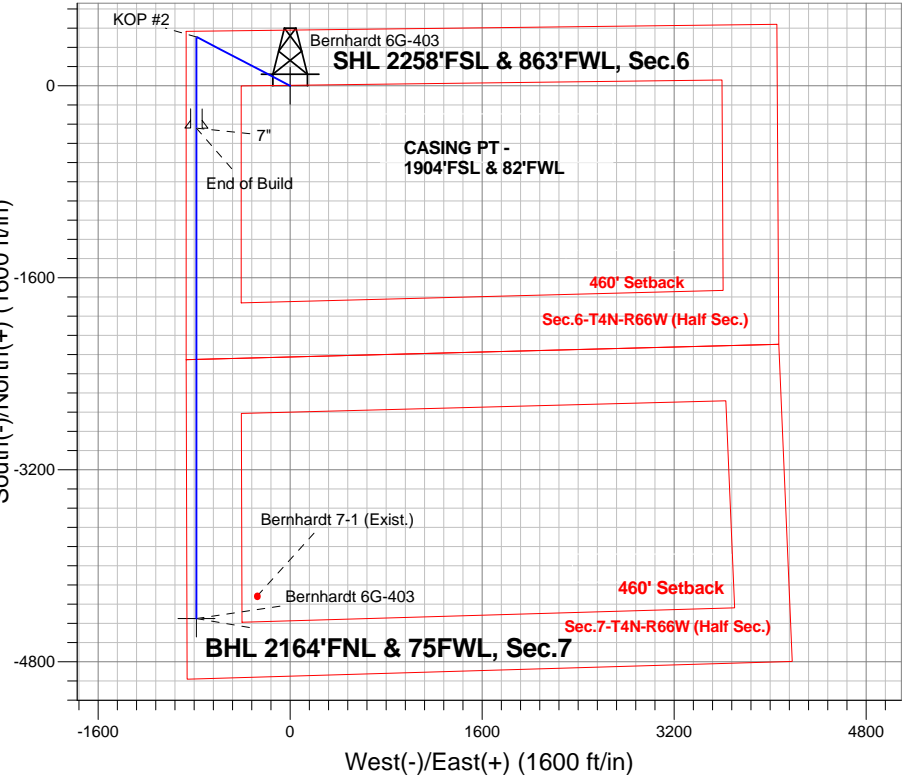
Magnetic Field
Strength: 52755.1srT
Dip Angle: 66.88°
Date: 9/3/2014
Model: IGRF2010

Bernhardt 4N66W6G Pad Sec.6-T4N-R66W
Bernhardt 6G-403
Plan #2 (9-3-14)

ANNOTATIONS

TVD	MD	Annotation
200.0	200.0	KOP #1
6428.9	6496.4	KOP #2
7192.9	7693.3	End of Build

South(-)/North(+) (1600 ft/in)



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	
3	650.7	9.01	297.49	648.8	16.3	-31.4	2.00	297.49	-10.9	
4	5816.8	9.01	297.49	5751.2	390.0	-749.3	0.00	0.00	-259.7	
5	6267.5	0.00	0.00	6200.0	406.3	-780.7	2.00	180.00	-270.6	
6	6496.4	0.00	0.00	6428.9	406.3	-780.7	0.00	0.00	-270.6	
7	7693.3	89.76	180.00	7192.9	-354.4	-780.7	7.50	180.00	479.6	
8	11779.7	89.76	180.00	7210.0	-4440.9	-780.7	0.00	0.00	4508.9	BHL 2164'FNL & 75FWL, Sec.7



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.6-T4N-R66W

Bernhardt 4N66W6G Pad Sec.6-T4N-R66W

Bernhardt 6G-403

Wellbore #1

Plan: Plan #2 (9-3-14)

Standard Planning Report

08 September, 2014

Database:	Landmark	Local Co-ordinate Reference:	Well Bernhardt 6G-403
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4737.0ft (RKB - 15')
Project:	SEC.6-T4N-R66W	MD Reference:	WELL @ 4737.0ft (RKB - 15')
Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	North Reference:	True
Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (9-3-14)		

Project	SEC.6-T4N-R66W, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site						Bernhardt 4N66W6G Pad Sec.6-T4N-R66W											
Site Position:						Northing:			1,367,654.84 ft			Latitude:			40.340660		
From:			Lat/Long			Easting:			3,187,571.86 ft			Longitude:			-104.827100		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.43 °		

Well	Bernhardt 6G-403					
Well Position	+N/-S	-211.3 ft	Northing:	1,367,444.41 ft	Latitude:	40.340080
	+E/-W	114.3 ft	Easting:	3,187,687.75 ft	Longitude:	-104.826690
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,722.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/3/2014	8.46	66.88	52,755

Design	Plan #2 (9-3-14)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	189.59

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
650.7	9.01	297.49	648.8	16.3	-31.4	2.00	2.00	0.00	297.49	
5,816.8	9.01	297.49	5,751.2	390.0	-749.3	0.00	0.00	0.00	0.00	
6,267.5	0.00	0.00	6,200.0	406.3	-780.7	2.00	-2.00	0.00	180.00	
6,496.4	0.00	0.00	6,428.9	406.3	-780.7	0.00	0.00	0.00	0.00	
7,693.3	89.76	180.00	7,192.9	-354.4	-780.7	7.50	7.50	0.00	180.00	
11,779.7	89.76	180.00	7,210.0	-4,440.9	-780.7	0.00	0.00	0.00	0.00	BHL 2164'FNL & 75

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Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4737.0ft (RKB - 15')
Project:	SEC.6-T4N-R66W	MD Reference:	WELL @ 4737.0ft (RKB - 15')
Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	North Reference:	True
Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (9-3-14)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP #1									
300.0	2.00	297.49	300.0	0.8	-1.5	-0.5	2.00	2.00	0.00
400.0	4.00	297.49	399.8	3.2	-6.2	-2.1	2.00	2.00	0.00
500.0	6.00	297.49	499.5	7.2	-13.9	-4.8	2.00	2.00	0.00
600.0	8.00	297.49	598.7	12.9	-24.7	-8.6	2.00	2.00	0.00
650.7	9.01	297.49	648.8	16.3	-31.4	-10.9	2.00	2.00	0.00
700.0	9.01	297.49	697.5	19.9	-38.2	-13.3	0.00	0.00	0.00
800.0	9.01	297.49	796.3	27.1	-52.1	-18.1	0.00	0.00	0.00
900.0	9.01	297.49	895.1	34.4	-66.0	-22.9	0.00	0.00	0.00
1,000.0	9.01	297.49	993.8	41.6	-79.9	-27.7	0.00	0.00	0.00
1,100.0	9.01	297.49	1,092.6	48.8	-93.8	-32.5	0.00	0.00	0.00
1,200.0	9.01	297.49	1,191.4	56.1	-107.7	-37.3	0.00	0.00	0.00
1,300.0	9.01	297.49	1,290.1	63.3	-121.6	-42.1	0.00	0.00	0.00
1,400.0	9.01	297.49	1,388.9	70.5	-135.5	-47.0	0.00	0.00	0.00
1,500.0	9.01	297.49	1,487.7	77.8	-149.4	-51.8	0.00	0.00	0.00
1,600.0	9.01	297.49	1,586.4	85.0	-163.3	-56.6	0.00	0.00	0.00
1,700.0	9.01	297.49	1,685.2	92.2	-177.2	-61.4	0.00	0.00	0.00
1,800.0	9.01	297.49	1,784.0	99.5	-191.1	-66.2	0.00	0.00	0.00
1,900.0	9.01	297.49	1,882.7	106.7	-205.0	-71.0	0.00	0.00	0.00
2,000.0	9.01	297.49	1,981.5	113.9	-218.9	-75.9	0.00	0.00	0.00
2,100.0	9.01	297.49	2,080.2	121.2	-232.8	-80.7	0.00	0.00	0.00
2,200.0	9.01	297.49	2,179.0	128.4	-246.7	-85.5	0.00	0.00	0.00
2,300.0	9.01	297.49	2,277.8	135.6	-260.6	-90.3	0.00	0.00	0.00
2,400.0	9.01	297.49	2,376.5	142.9	-274.5	-95.1	0.00	0.00	0.00
2,500.0	9.01	297.49	2,475.3	150.1	-288.4	-99.9	0.00	0.00	0.00
2,600.0	9.01	297.49	2,574.1	157.3	-302.3	-104.8	0.00	0.00	0.00
2,700.0	9.01	297.49	2,672.8	164.5	-316.2	-109.6	0.00	0.00	0.00
2,800.0	9.01	297.49	2,771.6	171.8	-330.1	-114.4	0.00	0.00	0.00
2,900.0	9.01	297.49	2,870.4	179.0	-344.0	-119.2	0.00	0.00	0.00
3,000.0	9.01	297.49	2,969.1	186.2	-357.9	-124.0	0.00	0.00	0.00
3,100.0	9.01	297.49	3,067.9	193.5	-371.8	-128.8	0.00	0.00	0.00
3,200.0	9.01	297.49	3,166.7	200.7	-385.7	-133.7	0.00	0.00	0.00
3,300.0	9.01	297.49	3,265.4	207.9	-399.6	-138.5	0.00	0.00	0.00
3,400.0	9.01	297.49	3,364.2	215.2	-413.4	-143.3	0.00	0.00	0.00
3,500.0	9.01	297.49	3,463.0	222.4	-427.3	-148.1	0.00	0.00	0.00
3,600.0	9.01	297.49	3,561.7	229.6	-441.2	-152.9	0.00	0.00	0.00
3,700.0	9.01	297.49	3,660.5	236.9	-455.1	-157.7	0.00	0.00	0.00
3,800.0	9.01	297.49	3,759.3	244.1	-469.0	-162.5	0.00	0.00	0.00
3,900.0	9.01	297.49	3,858.0	251.3	-482.9	-167.4	0.00	0.00	0.00
4,000.0	9.01	297.49	3,956.8	258.6	-496.8	-172.2	0.00	0.00	0.00
4,100.0	9.01	297.49	4,055.6	265.8	-510.7	-177.0	0.00	0.00	0.00
4,200.0	9.01	297.49	4,154.3	273.0	-524.6	-181.8	0.00	0.00	0.00
4,300.0	9.01	297.49	4,253.1	280.3	-538.5	-186.6	0.00	0.00	0.00
4,400.0	9.01	297.49	4,351.8	287.5	-552.4	-191.4	0.00	0.00	0.00
4,500.0	9.01	297.49	4,450.6	294.7	-566.3	-196.3	0.00	0.00	0.00
4,600.0	9.01	297.49	4,549.4	302.0	-580.2	-201.1	0.00	0.00	0.00
4,700.0	9.01	297.49	4,648.1	309.2	-594.1	-205.9	0.00	0.00	0.00
4,800.0	9.01	297.49	4,746.9	316.4	-608.0	-210.7	0.00	0.00	0.00
4,900.0	9.01	297.49	4,845.7	323.7	-621.9	-215.5	0.00	0.00	0.00
5,000.0	9.01	297.49	4,944.4	330.9	-635.8	-220.3	0.00	0.00	0.00

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Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	North Reference:	True
Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (9-3-14)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,100.0	9.01	297.49	5,043.2	338.1	-649.7	-225.2	0.00	0.00	0.00
5,200.0	9.01	297.49	5,142.0	345.4	-663.6	-230.0	0.00	0.00	0.00
5,300.0	9.01	297.49	5,240.7	352.6	-677.5	-234.8	0.00	0.00	0.00
5,400.0	9.01	297.49	5,339.5	359.8	-691.4	-239.6	0.00	0.00	0.00
5,500.0	9.01	297.49	5,438.3	367.1	-705.3	-244.4	0.00	0.00	0.00
5,600.0	9.01	297.49	5,537.0	374.3	-719.2	-249.2	0.00	0.00	0.00
5,700.0	9.01	297.49	5,635.8	381.5	-733.1	-254.1	0.00	0.00	0.00
5,800.0	9.01	297.49	5,734.6	388.8	-747.0	-258.9	0.00	0.00	0.00
5,816.8	9.01	297.49	5,751.2	390.0	-749.3	-259.7	0.00	0.00	0.00
5,900.0	7.35	297.49	5,833.5	395.4	-759.8	-263.3	2.00	-2.00	0.00
6,000.0	5.35	297.49	5,932.9	400.5	-769.6	-266.7	2.00	-2.00	0.00
6,100.0	3.35	297.49	6,032.6	404.0	-776.4	-269.0	2.00	-2.00	0.00
6,200.0	1.35	297.49	6,132.5	405.9	-780.0	-270.3	2.00	-2.00	0.00
6,267.5	0.00	0.00	6,200.0	406.3	-780.7	-270.6	2.00	-2.00	0.00
6,300.0	0.00	0.00	6,232.5	406.3	-780.7	-270.6	0.00	0.00	0.00
6,400.0	0.00	0.00	6,332.5	406.3	-780.7	-270.6	0.00	0.00	0.00
6,496.4	0.00	0.00	6,428.9	406.3	-780.7	-270.6	0.00	0.00	0.00
KOP #2									
6,500.0	0.27	180.00	6,432.5	406.3	-780.7	-270.5	7.40	7.40	0.00
6,600.0	7.77	180.00	6,532.2	399.3	-780.7	-263.6	7.50	7.50	0.00
6,700.0	15.27	180.00	6,630.1	379.3	-780.7	-244.0	7.50	7.50	0.00
6,800.0	22.77	180.00	6,724.6	346.8	-780.7	-211.9	7.50	7.50	0.00
6,900.0	30.27	180.00	6,814.0	302.2	-780.7	-167.9	7.50	7.50	0.00
7,000.0	37.77	180.00	6,896.8	246.3	-780.7	-112.8	7.50	7.50	0.00
7,100.0	45.27	180.00	6,971.6	180.0	-780.7	-47.4	7.50	7.50	0.00
7,200.0	52.77	180.00	7,037.2	104.6	-780.7	26.9	7.50	7.50	0.00
7,300.0	60.27	180.00	7,092.3	21.3	-780.7	109.1	7.50	7.50	0.00
7,400.0	67.77	180.00	7,136.1	-68.6	-780.7	197.7	7.50	7.50	0.00
7,500.0	75.27	180.00	7,167.8	-163.3	-780.7	291.1	7.50	7.50	0.00
7,600.0	82.77	180.00	7,186.8	-261.4	-780.7	387.9	7.50	7.50	0.00
7,693.3	89.76	180.00	7,192.9	-354.5	-780.7	479.6	7.50	7.50	0.00
End of Build - 7"									
7,700.0	89.76	180.00	7,192.9	-361.2	-780.7	486.2	0.00	0.00	0.00
7,800.0	89.76	180.00	7,193.3	-461.2	-780.7	584.8	0.00	0.00	0.00
7,900.0	89.76	180.00	7,193.7	-561.2	-780.7	683.4	0.00	0.00	0.00
8,000.0	89.76	180.00	7,194.2	-661.2	-780.7	782.0	0.00	0.00	0.00
8,100.0	89.76	180.00	7,194.6	-761.2	-780.7	880.6	0.00	0.00	0.00
8,200.0	89.76	180.00	7,195.0	-861.2	-780.7	979.2	0.00	0.00	0.00
8,300.0	89.76	180.00	7,195.4	-961.2	-780.7	1,077.8	0.00	0.00	0.00
8,400.0	89.76	180.00	7,195.8	-1,061.2	-780.7	1,176.4	0.00	0.00	0.00
8,500.0	89.76	180.00	7,196.3	-1,161.2	-780.7	1,275.0	0.00	0.00	0.00
8,600.0	89.76	180.00	7,196.7	-1,261.2	-780.7	1,373.6	0.00	0.00	0.00
8,700.0	89.76	180.00	7,197.1	-1,361.2	-780.7	1,472.2	0.00	0.00	0.00
8,800.0	89.76	180.00	7,197.5	-1,461.2	-780.7	1,570.8	0.00	0.00	0.00
8,900.0	89.76	180.00	7,197.9	-1,561.2	-780.7	1,669.4	0.00	0.00	0.00
9,000.0	89.76	180.00	7,198.4	-1,661.2	-780.7	1,768.0	0.00	0.00	0.00
9,100.0	89.76	180.00	7,198.8	-1,761.2	-780.7	1,866.6	0.00	0.00	0.00
9,200.0	89.76	180.00	7,199.2	-1,861.2	-780.7	1,965.2	0.00	0.00	0.00
9,300.0	89.76	180.00	7,199.6	-1,961.2	-780.7	2,063.8	0.00	0.00	0.00
9,400.0	89.76	180.00	7,200.0	-2,061.2	-780.7	2,162.4	0.00	0.00	0.00
9,500.0	89.76	180.00	7,200.5	-2,161.2	-780.7	2,261.0	0.00	0.00	0.00
9,600.0	89.76	180.00	7,200.9	-2,261.2	-780.7	2,359.6	0.00	0.00	0.00
9,700.0	89.76	180.00	7,201.3	-2,361.2	-780.7	2,458.2	0.00	0.00	0.00

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Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	North Reference:	True
Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (9-3-14)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,800.0	89.76	180.00	7,201.7	-2,461.2	-780.7	2,556.8	0.00	0.00	0.00
9,900.0	89.76	180.00	7,202.1	-2,561.2	-780.7	2,655.4	0.00	0.00	0.00
10,000.0	89.76	180.00	7,202.5	-2,661.2	-780.7	2,754.0	0.00	0.00	0.00
10,100.0	89.76	180.00	7,203.0	-2,761.2	-780.7	2,852.6	0.00	0.00	0.00
10,200.0	89.76	180.00	7,203.4	-2,861.2	-780.7	2,951.2	0.00	0.00	0.00
10,300.0	89.76	180.00	7,203.8	-2,961.2	-780.7	3,049.9	0.00	0.00	0.00
10,400.0	89.76	180.00	7,204.2	-3,061.2	-780.7	3,148.5	0.00	0.00	0.00
10,500.0	89.76	180.00	7,204.6	-3,161.2	-780.7	3,247.1	0.00	0.00	0.00
10,600.0	89.76	180.00	7,205.1	-3,261.2	-780.7	3,345.7	0.00	0.00	0.00
10,700.0	89.76	180.00	7,205.5	-3,361.2	-780.7	3,444.3	0.00	0.00	0.00
10,800.0	89.76	180.00	7,205.9	-3,461.2	-780.7	3,542.9	0.00	0.00	0.00
10,900.0	89.76	180.00	7,206.3	-3,561.2	-780.7	3,641.5	0.00	0.00	0.00
11,000.0	89.76	180.00	7,206.7	-3,661.2	-780.7	3,740.1	0.00	0.00	0.00
11,100.0	89.76	180.00	7,207.2	-3,761.2	-780.7	3,838.7	0.00	0.00	0.00
11,200.0	89.76	180.00	7,207.6	-3,861.2	-780.7	3,937.3	0.00	0.00	0.00
11,300.0	89.76	180.00	7,208.0	-3,961.2	-780.7	4,035.9	0.00	0.00	0.00
11,400.0	89.76	180.00	7,208.4	-4,061.2	-780.7	4,134.5	0.00	0.00	0.00
11,500.0	89.76	180.00	7,208.8	-4,161.2	-780.7	4,233.1	0.00	0.00	0.00
11,600.0	89.76	180.00	7,209.2	-4,261.2	-780.7	4,331.7	0.00	0.00	0.00
11,700.0	89.76	180.00	7,209.7	-4,361.2	-780.7	4,430.3	0.00	0.00	0.00
11,779.7	89.76	180.00	7,210.0	-4,440.9	-780.7	4,508.9	0.00	0.00	0.00

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
BHL 2164'FNL & 75F'	0.00	0.00	7,210.0	-4,440.9	-780.7	1,362,997.92	3,186,940.83	40.327890	-104.829490
- plan hits target center									
- Point									
SHL 2258'FSL & 863'I	0.00	0.00	1.0	0.0	0.0	1,367,444.42	3,187,687.75	40.340080	-104.826690
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
7,693.3	7,192.9	7"	7	7-1/2	

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
200.0	200.0	0.0	0.0	KOP #1
6,496.4	6,428.9	406.3	-780.7	KOP #2
7,693.3	7,192.9	-354.5	-780.7	End of Build



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.6-T4N-R66W

Bernhardt 4N66W6G Pad Sec.6-T4N-R66W

Bernhardt 6G-403

Wellbore #1

Plan #2 (9-3-14)

Anticollision Report

08 September, 2014



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt 6G-403
Project:	SEC.6-T4N-R66W	TVD Reference:	WELL @ 4737.0ft (RKB - 15')
Reference Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	MD Reference:	WELL @ 4737.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #2 (9-3-14)	Offset TVD Reference:	Offset Datum

Reference	Plan #2 (9-3-14)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 600.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date 9/5/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,779.7	Plan #2 (9-3-14) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Bernhardt 4N66W6G Pad Sec.6-T4N-R66W						
Bernhardt 6G-323 - Wellbore #1 - Plan #2 (9-3-14)	200.0	200.0	31.5	30.8	46.742	CC, ES
Bernhardt 6G-323 - Wellbore #1 - Plan #2 (9-3-14)	11,779.7	11,667.9	358.3	193.8	2.178	SF
Bernhardt 6K-243 - Wellbore #1 - Plan #2 (9-3-14)	200.0	200.0	90.1	89.4	133.624	CC, ES
Bernhardt 6K-243 - Wellbore #1 - Plan #2 (9-3-14)	3,700.0	3,653.3	598.2	580.1	32.981	SF
Bernhardt 6K-443 - Wellbore #1 - Plan #2 (9-3-14)	200.0	200.0	60.3	59.7	89.469	CC, ES
Bernhardt 6K-443 - Wellbore #1 - Plan #2 (9-3-14)	5,300.0	5,281.9	564.4	536.0	19.905	SF
Existing Wells Sec.6-T4N-R66W						
Bernhardt 7-1 (Exist.) - Wellbore #1 - Wellbore #1	11,590.3	7,201.2	507.5	278.6	2.217	CC
Bernhardt 7-1 (Exist.) - Wellbore #1 - Wellbore #1	11,600.0	7,201.2	507.5	278.5	2.216	ES, SF

Offset Design Bernhardt 4N66W6G Pad Sec.6-T4N-R66W - Bernhardt 6G-323 - Wellbore #1 - Plan #2 (9-3-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor		
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
0.0	0.0	0.0	0.0	0.0	0.0	76.63	7.3	30.7	31.5					
100.0	100.0	100.0	100.0	0.1	0.1	76.63	7.3	30.7	31.5	31.3	0.22	140.227		
200.0	200.0	200.0	200.0	0.3	0.3	76.63	7.3	30.7	31.5	30.8	0.67	46.742 CC, ES		
300.0	300.0	300.0	300.0	0.6	0.6	141.11	7.3	30.7	32.9	31.7	1.12	29.274		
400.0	399.8	399.8	399.8	0.8	0.8	146.15	7.3	30.7	37.1	35.5	1.58	23.535		
500.0	499.5	499.5	499.5	1.0	1.0	152.32	7.3	30.7	44.6	42.5	2.04	21.898		
600.0	598.7	598.7	598.7	1.3	1.2	158.07	7.3	30.7	55.7	53.2	2.50	22.271		
700.0	697.5	697.5	697.5	1.7	1.5	162.68	7.3	30.7	70.0	67.1	2.96	23.668		
800.0	796.3	796.3	796.3	2.0	1.7	165.82	7.3	30.7	85.1	81.7	3.42	24.926		
900.0	895.1	898.2	898.1	2.4	1.9	167.66	8.4	29.4	98.9	95.1	3.87	25.553		
1,000.0	993.8	1,001.0	1,000.8	2.7	2.1	168.29	11.8	25.3	109.6	105.2	4.33	25.310		
1,100.0	1,092.6	1,104.5	1,103.9	3.1	2.4	168.07	17.7	18.3	116.9	112.1	4.80	24.360		
1,200.0	1,191.4	1,206.5	1,205.2	3.4	2.6	167.23	25.6	8.9	121.3	116.0	5.28	22.973		
1,300.0	1,290.1	1,306.4	1,304.3	3.8	2.9	166.36	33.7	-0.7	125.3	119.5	5.77	21.709		
1,400.0	1,388.9	1,406.3	1,403.4	4.2	3.2	165.54	41.7	-10.4	129.2	123.0	6.27	20.623		
1,500.0	1,487.7	1,506.2	1,502.5	4.5	3.5	164.77	49.8	-20.0	133.2	126.5	6.77	19.680		
1,600.0	1,586.4	1,606.1	1,601.6	4.9	3.8	164.05	57.9	-29.6	137.3	130.0	7.28	18.855		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt 6G-403
Project:	SEC.6-T4N-R66W	TVD Reference:	WELL @ 4737.0ft (RKB - 15')
Reference Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	MD Reference:	WELL @ 4737.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #2 (9-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Bernhardt 4N66W6G Pad Sec.6-T4N-R66W - Bernhardt 6G-323 - Wellbore #1 - Plan #2 (9-3-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
1,700.0	1,685.2	1,706.0	1,700.7	5.3	4.1	163.36	66.0	-39.2	141.3	133.5	7.79	18.130		
1,800.0	1,784.0	1,805.9	1,799.8	5.6	4.4	162.72	74.1	-48.9	145.4	137.0	8.31	17.486		
1,900.0	1,882.7	1,905.8	1,898.9	6.0	4.7	162.11	82.2	-58.5	149.4	140.6	8.84	16.912		
2,000.0	1,981.5	2,005.7	1,998.1	6.4	5.0	161.53	90.2	-68.1	153.5	144.2	9.36	16.396		
2,100.0	2,080.2	2,105.6	2,097.2	6.8	5.3	160.98	98.3	-77.7	157.6	147.7	9.89	15.931		
2,200.0	2,179.0	2,205.5	2,196.3	7.1	5.6	160.46	106.4	-87.4	161.8	151.3	10.43	15.510		
2,300.0	2,277.8	2,305.4	2,295.4	7.5	5.9	159.97	114.5	-97.0	165.9	154.9	10.97	15.127		
2,400.0	2,376.5	2,405.3	2,394.5	7.9	6.2	159.50	122.6	-106.6	170.0	158.5	11.51	14.777		
2,500.0	2,475.3	2,505.2	2,493.6	8.2	6.5	159.05	130.6	-116.2	174.2	162.1	12.05	14.456		
2,600.0	2,574.1	2,605.2	2,592.7	8.6	6.9	158.62	138.7	-125.9	178.4	165.8	12.60	14.161		
2,700.0	2,672.8	2,705.1	2,691.8	9.0	7.2	158.22	146.8	-135.5	182.5	169.4	13.14	13.889		
2,800.0	2,771.6	2,805.0	2,790.9	9.4	7.5	157.83	154.9	-145.1	186.7	173.0	13.69	13.637		
2,900.0	2,870.4	2,904.9	2,890.1	9.7	7.8	157.46	163.0	-154.7	190.9	176.7	14.24	13.403		
3,000.0	2,969.1	3,004.8	2,989.2	10.1	8.1	157.10	171.1	-164.4	195.1	180.3	14.80	13.185		
3,100.0	3,067.9	3,104.7	3,088.3	10.5	8.4	156.76	179.1	-174.0	199.3	184.0	15.35	12.982		
3,200.0	3,166.7	3,204.6	3,187.4	10.8	8.8	156.43	187.2	-183.6	203.5	187.6	15.91	12.793		
3,300.0	3,265.4	3,304.5	3,286.5	11.2	9.1	156.12	195.3	-193.2	207.8	191.3	16.47	12.615		
3,400.0	3,364.2	3,404.4	3,385.6	11.6	9.4	155.82	203.4	-202.9	212.0	195.0	17.03	12.449		
3,500.0	3,463.0	3,504.3	3,484.7	12.0	9.7	155.53	211.5	-212.5	216.2	198.6	17.59	12.292		
3,600.0	3,561.7	3,604.2	3,583.8	12.3	10.0	155.25	219.6	-222.1	220.5	202.3	18.15	12.145		
3,700.0	3,660.5	3,704.1	3,682.9	12.7	10.4	154.98	227.6	-231.7	224.7	206.0	18.72	12.006		
3,800.0	3,759.3	3,804.0	3,782.1	13.1	10.7	154.73	235.7	-241.4	229.0	209.7	19.28	11.874		
3,900.0	3,858.0	3,903.9	3,881.2	13.4	11.0	154.48	243.8	-251.0	233.2	213.4	19.85	11.750		
4,000.0	3,956.8	4,003.8	3,980.3	13.8	11.3	154.24	251.9	-260.6	237.5	217.1	20.42	11.632		
4,100.0	4,055.6	4,103.7	4,079.4	14.2	11.7	154.01	260.0	-270.2	241.7	220.8	20.98	11.521		
4,200.0	4,154.3	4,203.6	4,178.5	14.6	12.0	153.78	268.0	-279.9	246.0	224.4	21.55	11.414		
4,300.0	4,253.1	4,303.5	4,277.6	14.9	12.3	153.57	276.1	-289.5	250.3	228.1	22.12	11.313		
4,400.0	4,351.8	4,403.4	4,376.7	15.3	12.6	153.36	284.2	-299.1	254.5	231.8	22.69	11.217		
4,500.0	4,450.6	4,503.3	4,475.8	15.7	12.9	153.16	292.3	-308.7	258.8	235.6	23.26	11.126		
4,600.0	4,549.4	4,603.2	4,574.9	16.1	13.3	152.97	300.4	-318.4	263.1	239.3	23.83	11.038		
4,700.0	4,648.1	4,703.1	4,674.0	16.4	13.6	152.78	308.5	-328.0	267.4	243.0	24.41	10.955		
4,800.0	4,746.9	4,803.0	4,773.2	16.8	13.9	152.59	316.5	-337.6	271.7	246.7	24.98	10.875		
4,900.0	4,845.7	4,903.0	4,872.3	17.2	14.2	152.42	324.6	-347.2	275.9	250.4	25.55	10.798		
5,000.0	4,944.4	5,002.9	4,971.4	17.5	14.6	152.25	332.7	-356.9	280.2	254.1	26.13	10.725		
5,100.0	5,043.2	5,102.8	5,070.5	17.9	14.9	152.08	340.8	-366.5	284.5	257.8	26.70	10.655		
5,200.0	5,142.0	5,202.7	5,169.6	18.3	15.2	151.92	348.9	-376.1	288.8	261.5	27.28	10.587		
5,300.0	5,240.7	5,302.6	5,268.7	18.7	15.5	151.76	357.0	-385.7	293.1	265.3	27.86	10.523		
5,400.0	5,339.5	5,402.5	5,367.8	19.0	15.8	151.61	365.0	-395.4	297.4	269.0	28.43	10.460		
5,500.0	5,438.3	5,502.4	5,466.9	19.4	16.2	151.46	373.1	-405.0	301.7	272.7	29.01	10.401		
5,600.0	5,537.0	5,602.3	5,566.0	19.8	16.5	151.32	381.2	-414.6	306.0	276.4	29.59	10.343		
5,700.0	5,635.8	5,702.2	5,665.2	20.1	16.8	151.18	389.3	-424.2	310.3	280.2	30.16	10.288		
5,800.0	5,734.6	5,800.0	5,762.2	20.5	17.1	151.06	397.1	-433.6	314.7	284.0	30.73	10.241		
5,900.0	5,833.5	5,892.4	5,854.1	20.8	17.3	151.14	403.2	-440.8	319.8	288.6	31.18	10.257		
6,000.0	5,932.9	5,984.5	5,946.0	21.1	17.5	151.30	407.3	-445.7	324.2	292.7	31.53	10.284		
6,100.0	6,032.6	6,076.5	6,038.0	21.3	17.7	151.53	409.6	-448.4	328.1	296.2	31.81	10.312		
6,200.0	6,132.5	6,171.1	6,132.5	21.4	17.8	151.80	410.0	-448.9	331.1	299.1	32.05	10.332		
6,300.0	6,232.5	6,271.1	6,232.5	21.5	18.0	89.36	410.0	-448.9	331.8	299.5	32.33	10.262		
6,400.0	6,332.5	6,371.1	6,332.5	21.7	18.1	89.36	410.0	-448.9	331.8	299.1	32.69	10.150		
6,491.7	6,424.2	6,462.9	6,424.2	21.8	18.2	-90.04	406.3	-448.9	331.8	298.9	32.88	10.092		
6,500.0	6,432.5	6,471.2	6,432.4	21.8	18.3	-89.86	405.5	-448.9	331.8	298.9	32.87	10.095		
6,600.0	6,532.2	6,569.9	6,529.6	21.9	18.3	-88.09	388.5	-448.9	332.0	299.2	32.73	10.142		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt 6G-403
Project:	SEC.6-T4N-R66W	TVD Reference:	WELL @ 4737.0ft (RKB - 15')
Reference Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	MD Reference:	WELL @ 4737.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #2 (9-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Bernhardt 4N66W6G Pad Sec.6-T4N-R66W - Bernhardt 6G-323 - Wellbore #1 - Plan #2 (9-3-14)												Offset Site Error: 0.0 ft		
Survey Program: 0-MWD												Offset Well Error: 0.0 ft		
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
6,700.0	6,630.1	6,667.3	6,622.5	21.9	18.3	-86.36	359.5	-448.9	332.5	300.0	32.47	10.239		
6,800.0	6,724.6	6,763.5	6,710.0	21.9	18.2	-84.71	319.6	-448.9	333.2	301.1	32.14	10.366		
6,900.0	6,814.0	6,858.7	6,790.9	21.8	18.1	-83.16	269.6	-448.9	334.2	302.4	31.82	10.503		
7,000.0	6,896.8	6,952.9	6,864.2	21.7	18.0	-81.73	210.5	-448.9	335.3	303.7	31.56	10.625		
7,100.0	6,971.6	7,046.2	6,929.2	21.6	17.8	-80.45	143.6	-448.9	336.5	305.1	31.42	10.710		
7,200.0	7,037.2	7,138.8	6,985.1	21.5	17.7	-79.33	69.9	-448.9	337.6	306.2	31.46	10.734		
7,300.0	7,092.3	7,230.8	7,031.4	21.4	17.7	-78.39	-9.5	-448.9	338.7	307.0	31.71	10.681		
7,400.0	7,136.1	7,322.2	7,067.6	21.4	17.7	-77.63	-93.4	-448.9	339.7	307.5	32.22	10.544		
7,500.0	7,167.8	7,413.2	7,093.5	21.5	17.9	-77.06	-180.6	-448.9	340.4	307.4	33.00	10.317		
7,600.0	7,186.8	7,504.0	7,108.8	21.7	18.4	-76.69	-270.1	-448.9	340.9	306.9	34.04	10.015		
7,700.0	7,192.9	7,595.3	7,113.4	22.1	19.1	-76.52	-361.2	-448.9	341.2	305.8	35.36	9.648		
7,800.0	7,193.3	7,694.5	7,112.4	22.8	20.1	-76.30	-460.4	-448.9	341.5	304.3	37.16	9.191		
7,900.0	7,193.7	7,794.5	7,111.5	23.6	21.2	-76.08	-560.4	-448.9	341.8	302.6	39.22	8.715		
8,000.0	7,194.2	7,894.5	7,110.6	24.6	22.4	-75.86	-660.4	-448.9	342.2	300.6	41.51	8.242		
8,100.0	7,194.6	7,994.5	7,109.6	25.8	23.7	-75.64	-760.4	-448.9	342.5	298.5	43.99	7.785		
8,200.0	7,195.0	8,094.5	7,108.7	27.0	25.1	-75.42	-860.4	-448.9	342.8	296.2	46.63	7.352		
8,300.0	7,195.4	8,194.5	7,107.7	28.3	26.5	-75.20	-960.4	-448.9	343.2	293.8	49.40	6.947		
8,400.0	7,195.8	8,294.5	7,106.8	29.7	28.0	-74.98	-1,060.3	-448.9	343.5	291.3	52.28	6.571		
8,500.0	7,196.3	8,394.5	7,105.9	31.2	29.6	-74.76	-1,160.3	-448.9	343.9	288.6	55.25	6.224		
8,600.0	7,196.7	8,494.5	7,104.9	32.7	31.1	-74.54	-1,260.3	-448.9	344.2	286.0	58.29	5.905		
8,700.0	7,197.1	8,594.5	7,104.0	34.2	32.8	-74.32	-1,360.3	-448.9	344.6	283.2	61.40	5.612		
8,800.0	7,197.5	8,694.4	7,103.0	35.8	34.4	-74.10	-1,460.3	-448.9	345.0	280.4	64.56	5.344		
8,900.0	7,197.9	8,794.4	7,102.1	37.4	36.1	-73.89	-1,560.3	-448.9	345.4	277.6	67.76	5.097		
9,000.0	7,198.4	8,894.4	7,101.1	39.0	37.8	-73.67	-1,660.3	-448.9	345.7	274.7	71.00	4.869		
9,100.0	7,198.8	8,994.4	7,100.2	40.7	39.5	-73.45	-1,760.2	-448.9	346.1	271.9	74.27	4.660		
9,200.0	7,199.2	9,094.4	7,099.3	42.4	41.3	-73.24	-1,860.2	-448.9	346.5	268.9	77.57	4.467		
9,300.0	7,199.6	9,194.4	7,098.3	44.1	43.0	-73.02	-1,960.2	-448.9	346.9	266.0	80.88	4.289		
9,400.0	7,200.0	9,294.4	7,097.4	45.8	44.8	-72.81	-2,060.2	-448.9	347.3	263.1	84.22	4.124		
9,500.0	7,200.5	9,394.4	7,096.4	47.5	46.5	-72.59	-2,160.2	-448.9	347.7	260.1	87.57	3.971		
9,600.0	7,200.9	9,494.4	7,095.5	49.3	48.3	-72.38	-2,260.2	-448.9	348.1	257.2	90.93	3.829		
9,700.0	7,201.3	9,594.4	7,094.5	51.1	50.1	-72.17	-2,360.2	-448.9	348.5	254.2	94.30	3.696		
9,800.0	7,201.7	9,694.4	7,093.6	52.8	51.9	-71.95	-2,460.2	-448.9	349.0	251.3	97.68	3.573		
9,900.0	7,202.1	9,794.3	7,092.7	54.6	53.8	-71.74	-2,560.1	-448.9	349.4	248.3	101.06	3.457		
10,000.0	7,202.5	9,894.3	7,091.7	56.4	55.6	-71.53	-2,660.1	-448.9	349.8	245.4	104.45	3.349		
10,100.0	7,203.0	9,994.3	7,090.8	58.2	57.4	-71.32	-2,760.1	-448.9	350.2	242.4	107.84	3.248		
10,200.0	7,203.4	10,094.3	7,089.8	60.0	59.2	-71.11	-2,860.1	-448.9	350.7	239.4	111.24	3.153		
10,300.0	7,203.8	10,194.3	7,088.9	61.8	61.1	-70.90	-2,960.1	-448.9	351.1	236.5	114.64	3.063		
10,400.0	7,204.2	10,294.3	7,087.9	63.6	62.9	-70.69	-3,060.1	-448.9	351.6	233.5	118.03	2.979		
10,500.0	7,204.6	10,394.3	7,087.0	65.5	64.8	-70.48	-3,160.1	-448.9	352.0	230.6	121.43	2.899		
10,600.0	7,205.1	10,494.3	7,086.1	67.3	66.6	-70.27	-3,260.0	-448.9	352.5	227.7	124.82	2.824		
10,700.0	7,205.5	10,594.3	7,085.1	69.1	68.5	-70.06	-3,360.0	-448.9	352.9	224.7	128.21	2.753		
10,800.0	7,205.9	10,694.3	7,084.2	71.0	70.3	-69.85	-3,460.0	-448.9	353.4	221.8	131.60	2.686		
10,900.0	7,206.3	10,794.3	7,083.2	72.8	72.2	-69.65	-3,560.0	-448.9	353.9	218.9	134.98	2.622		
11,000.0	7,206.7	10,894.2	7,082.3	74.6	74.1	-69.44	-3,660.0	-448.9	354.4	216.0	138.37	2.561		
11,100.0	7,207.2	10,994.2	7,081.3	76.5	75.9	-69.24	-3,760.0	-448.9	354.8	213.1	141.74	2.503		
11,200.0	7,207.6	11,094.2	7,080.4	78.4	77.8	-69.03	-3,860.0	-448.9	355.3	210.2	145.11	2.449		
11,300.0	7,208.0	11,194.2	7,079.5	80.2	79.7	-68.83	-3,959.9	-448.9	355.8	207.3	148.48	2.396		
11,400.0	7,208.4	11,294.2	7,078.5	82.1	81.5	-68.62	-4,059.9	-448.9	356.3	204.5	151.84	2.347		
11,500.0	7,208.8	11,394.2	7,077.6	83.9	83.4	-68.42	-4,159.9	-448.9	356.8	201.6	155.20	2.299		
11,600.0	7,209.2	11,494.2	7,076.6	85.8	85.3	-68.22	-4,259.9	-448.9	357.3	198.8	158.55	2.254		
11,700.0	7,209.7	11,594.2	7,075.7	87.7	87.2	-68.01	-4,359.9	-448.9	357.8	195.9	161.89	2.210		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt 6G-403
Project:	SEC.6-T4N-R66W	TVD Reference:	WELL @ 4737.0ft (RKB - 15')
Reference Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	MD Reference:	WELL @ 4737.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #2 (9-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Bernhardt 4N66W6G Pad Sec.6-T4N-R66W - Bernhardt 6G-323 - Wellbore #1 - Plan #2 (9-3-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference	Offset	Semi Major Axis		Distance										
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
11,779.7	7,210.0	11,667.9	7,075.0	89.2	88.6	-67.86	-4,433.6	-448.9	358.3	193.8	164.46	2.178 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt 6G-403
Project:	SEC.6-T4N-R66W	TVD Reference:	WELL @ 4737.0ft (RKB - 15')
Reference Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	MD Reference:	WELL @ 4737.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #2 (9-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Bernhardt 4N66W6G Pad Sec.6-T4N-R66W - Bernhardt 6K-243 - Wellbore #1 - Plan #2 (9-3-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	73.56	73.56	25.5	86.4	90.1				
100.0	100.0	100.0	100.0	0.1	0.1	73.56	73.56	25.5	86.4	90.1	89.9	0.22	400.872	
200.0	200.0	200.0	200.0	0.3	0.3	73.56	73.56	25.5	86.4	90.1	89.4	0.67	133.624 CC, ES	
300.0	300.0	300.0	300.0	0.6	0.6	136.81	136.81	25.5	86.4	91.4	90.2	1.12	81.439	
400.0	399.8	399.8	399.8	0.8	0.8	138.91	138.91	25.5	86.4	95.3	93.7	1.57	60.504	
500.0	499.5	499.5	499.5	1.0	1.0	142.04	142.04	25.5	86.4	102.0	99.9	2.04	50.065	
600.0	598.7	598.7	598.7	1.3	1.2	145.76	145.76	25.5	86.4	111.9	109.4	2.51	44.580	
700.0	697.5	697.5	697.5	1.7	1.5	149.62	149.62	25.5	86.4	124.8	121.8	2.98	41.831	
800.0	796.3	796.3	796.3	2.0	1.7	152.89	152.89	25.5	86.4	138.6	135.1	3.45	40.136	
900.0	895.1	895.1	895.1	2.4	1.9	155.57	155.57	25.5	86.4	152.7	148.8	3.92	38.954	
1,000.0	993.8	993.8	993.8	2.7	2.1	157.78	157.78	25.5	86.4	167.1	162.7	4.39	38.097	
1,100.0	1,092.6	1,092.6	1,092.6	3.1	2.3	159.65	159.65	25.5	86.4	181.7	176.9	4.85	37.453	
1,200.0	1,191.4	1,191.4	1,191.4	3.4	2.6	161.24	161.24	25.5	86.4	196.5	191.2	5.32	36.956	
1,300.0	1,290.1	1,290.1	1,290.1	3.8	2.8	162.60	162.60	25.5	86.4	211.4	205.7	5.78	36.563	
1,400.0	1,388.9	1,388.9	1,388.9	4.2	3.0	163.78	163.78	25.5	86.4	226.5	220.2	6.25	36.245	
1,500.0	1,487.7	1,487.7	1,487.7	4.5	3.2	164.82	164.82	25.5	86.4	241.5	234.8	6.71	35.982	
1,600.0	1,586.4	1,586.4	1,586.4	4.9	3.5	165.74	165.74	25.5	86.4	256.7	249.5	7.18	35.763	
1,700.0	1,685.2	1,685.2	1,685.2	5.3	3.7	166.55	166.55	25.5	86.4	271.9	264.3	7.64	35.577	
1,800.0	1,784.0	1,784.0	1,784.0	5.6	3.9	167.28	167.28	25.5	86.4	287.2	279.1	8.11	35.417	
1,900.0	1,882.7	1,882.7	1,882.7	6.0	4.1	167.93	167.93	25.5	86.4	302.5	293.9	8.58	35.278	
2,000.0	1,981.5	1,981.5	1,981.5	6.4	4.3	168.52	168.52	25.5	86.4	317.9	308.8	9.04	35.157	
2,100.0	2,080.2	2,080.1	2,080.1	6.8	4.6	168.86	168.86	26.6	86.8	333.2	323.7	9.51	35.048	
2,200.0	2,179.0	2,178.7	2,178.6	7.1	4.8	168.62	168.62	30.8	88.1	348.7	338.7	9.98	34.937	
2,300.0	2,277.8	2,277.0	2,276.6	7.5	5.0	167.85	167.85	38.3	90.4	364.3	353.8	10.46	34.814	
2,400.0	2,376.5	2,375.0	2,374.0	7.9	5.2	166.65	166.65	48.9	93.7	380.0	369.1	10.96	34.677	
2,500.0	2,475.3	2,473.4	2,471.5	8.2	5.5	165.36	165.36	60.7	97.4	396.1	384.6	11.47	34.524	
2,600.0	2,574.1	2,571.7	2,569.1	8.6	5.7	164.17	164.17	72.5	101.1	412.3	400.3	11.99	34.372	
2,700.0	2,672.8	2,670.0	2,666.6	9.0	6.0	163.07	163.07	84.3	104.8	428.6	416.1	12.53	34.221	
2,800.0	2,771.6	2,768.3	2,764.1	9.4	6.2	162.05	162.05	96.1	108.5	445.1	432.1	13.06	34.072	
2,900.0	2,870.4	2,866.7	2,861.7	9.7	6.5	161.10	161.10	107.9	112.2	461.8	448.2	13.61	33.928	
3,000.0	2,969.1	2,965.0	2,959.2	10.1	6.7	160.22	160.22	119.7	115.9	478.5	464.4	14.16	33.789	
3,100.0	3,067.9	3,063.3	3,056.8	10.5	7.0	159.40	159.40	131.5	119.6	495.4	480.7	14.72	33.656	
3,200.0	3,166.7	3,161.6	3,154.3	10.8	7.3	158.63	158.63	143.3	123.3	512.3	497.1	15.28	33.529	
3,300.0	3,265.4	3,260.0	3,251.9	11.2	7.6	157.91	157.91	155.1	127.0	529.4	513.5	15.85	33.408	
3,400.0	3,364.2	3,358.3	3,349.4	11.6	7.8	157.23	157.23	166.9	130.7	546.5	530.1	16.41	33.293	
3,500.0	3,463.0	3,456.6	3,447.0	12.0	8.1	156.60	156.60	178.7	134.4	563.7	546.7	16.99	33.183	
3,600.0	3,561.7	3,555.0	3,544.5	12.3	8.4	156.00	156.00	190.5	138.1	580.9	563.3	17.56	33.080	
3,700.0	3,660.5	3,653.3	3,642.1	12.7	8.7	155.44	155.44	202.3	141.8	598.2	580.1	18.14	32.981 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt 6G-403
Project:	SEC.6-T4N-R66W	TVD Reference:	WELL @ 4737.0ft (RKB - 15')
Reference Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	MD Reference:	WELL @ 4737.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #2 (9-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Bernhardt 4N66W6G Pad Sec.6-T4N-R66W - Bernhardt 6K-443 - Wellbore #1 - Plan #2 (9-3-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	76.02	14.6	58.5	60.3					
100.0	100.0	100.0	100.0	0.1	0.1	76.02	14.6	58.5	60.3	60.1	0.22	268.407		
200.0	200.0	200.0	200.0	0.3	0.3	76.02	14.6	58.5	60.3	59.7	0.67	89.469 CC, ES		
300.0	300.0	300.0	300.0	0.6	0.6	139.58	14.6	58.5	61.6	60.5	1.12	54.932		
400.0	399.8	399.8	399.8	0.8	0.8	142.49	14.6	58.5	65.7	64.1	1.57	41.730		
500.0	499.5	499.5	499.5	1.0	1.0	146.58	14.6	58.5	72.8	70.8	2.04	35.763		
600.0	598.7	598.7	598.7	1.3	1.2	151.10	14.6	58.5	83.3	80.8	2.50	33.253		
700.0	697.5	697.5	697.5	1.7	1.5	155.39	14.6	58.5	96.9	94.0	2.97	32.623		
800.0	796.3	796.3	796.3	2.0	1.7	158.74	14.6	58.5	111.4	108.0	3.43	32.446		
900.0	895.1	895.1	895.1	2.4	1.9	161.32	14.6	58.5	126.1	122.2	3.89	32.384		
1,000.0	893.8	893.8	893.8	2.7	2.1	163.35	14.6	58.5	141.1	136.7	4.36	32.378		
1,100.0	1,092.6	1,092.6	1,092.6	3.1	2.3	165.00	14.6	58.5	156.2	151.3	4.82	32.399		
1,200.0	1,191.4	1,191.4	1,191.4	3.4	2.6	166.35	14.6	58.5	171.4	166.1	5.28	32.433		
1,300.0	1,290.1	1,290.1	1,290.1	3.8	2.8	167.49	14.6	58.5	186.6	180.9	5.75	32.472		
1,400.0	1,388.9	1,388.9	1,388.9	4.2	3.0	168.45	14.6	58.5	202.0	195.7	6.21	32.512		
1,500.0	1,487.7	1,487.7	1,487.7	4.5	3.2	169.28	14.6	58.5	217.3	210.7	6.68	32.551		
1,600.0	1,586.4	1,586.4	1,586.4	4.9	3.5	169.99	14.6	58.5	232.8	225.6	7.14	32.588		
1,700.0	1,685.2	1,690.4	1,690.4	5.3	3.7	170.41	15.9	58.0	247.3	239.7	7.62	32.463		
1,800.0	1,784.0	1,795.9	1,795.8	5.6	3.9	170.15	20.7	55.8	259.4	251.3	8.10	32.036		
1,900.0	1,882.7	1,901.9	1,901.3	6.0	4.2	169.29	29.1	52.1	269.2	260.6	8.59	31.334		
2,000.0	1,981.5	2,004.4	2,003.2	6.4	4.4	168.01	40.1	47.1	276.9	267.8	9.09	30.464		
2,100.0	2,080.2	2,104.0	2,101.9	6.8	4.7	166.77	51.3	42.1	284.5	274.9	9.59	29.653		
2,200.0	2,179.0	2,203.5	2,200.7	7.1	4.9	165.60	62.4	37.2	292.2	282.1	10.11	28.907		
2,300.0	2,277.8	2,303.0	2,299.5	7.5	5.2	164.48	73.5	32.2	300.1	289.5	10.63	28.221		
2,400.0	2,376.5	2,402.5	2,398.3	7.9	5.4	163.43	84.6	27.2	308.1	296.9	11.17	27.587		
2,500.0	2,475.3	2,502.1	2,497.0	8.2	5.7	162.42	95.7	22.3	316.1	304.4	11.71	27.001		
2,600.0	2,574.1	2,601.6	2,595.8	8.6	6.0	161.47	106.8	17.3	324.3	312.0	12.26	26.458		
2,700.0	2,672.8	2,701.1	2,694.6	9.0	6.3	160.56	117.9	12.3	332.5	319.7	12.81	25.955		
2,800.0	2,771.6	2,800.6	2,793.4	9.4	6.5	159.70	129.0	7.4	340.8	327.5	13.37	25.488		
2,900.0	2,870.4	2,900.2	2,892.2	9.7	6.8	158.88	140.1	2.4	349.2	335.3	13.94	25.054		
3,000.0	2,969.1	2,999.7	2,990.9	10.1	7.1	158.10	151.2	-2.6	357.7	343.2	14.51	24.649		
3,100.0	3,067.9	3,099.2	3,089.7	10.5	7.4	157.35	162.3	-7.5	366.2	351.1	15.09	24.271		
3,200.0	3,166.7	3,198.7	3,188.5	10.8	7.7	156.64	173.4	-12.5	374.8	359.1	15.67	23.918		
3,300.0	3,265.4	3,298.3	3,287.3	11.2	8.0	155.96	184.5	-17.5	383.4	367.2	16.25	23.588		
3,400.0	3,364.2	3,397.8	3,386.1	11.6	8.3	155.31	195.6	-22.4	392.1	375.3	16.84	23.279		
3,500.0	3,463.0	3,497.3	3,484.8	12.0	8.6	154.68	206.7	-27.4	400.8	383.4	17.44	22.989		
3,600.0	3,561.7	3,596.8	3,583.6	12.3	8.9	154.09	217.9	-32.4	409.6	391.6	18.03	22.716		
3,700.0	3,660.5	3,696.4	3,682.4	12.7	9.2	153.52	229.0	-37.3	418.5	399.8	18.63	22.459		
3,800.0	3,759.3	3,795.9	3,781.2	13.1	9.5	152.97	240.1	-42.3	427.3	408.1	19.23	22.218		
3,900.0	3,858.0	3,895.4	3,879.9	13.4	9.8	152.45	251.2	-47.3	436.2	416.4	19.84	21.990		
4,000.0	3,956.8	3,994.9	3,978.7	13.8	10.1	151.94	262.3	-52.2	445.1	424.7	20.44	21.775		
4,100.0	4,055.6	4,094.5	4,077.5	14.2	10.4	151.46	273.4	-57.2	454.1	433.1	21.05	21.571		
4,200.0	4,154.3	4,194.0	4,176.3	14.6	10.7	150.99	284.5	-62.2	463.1	441.5	21.66	21.379		
4,300.0	4,253.1	4,293.5	4,275.1	14.9	11.0	150.54	295.6	-67.1	472.1	449.9	22.27	21.197		
4,400.0	4,351.8	4,393.0	4,373.8	15.3	11.3	150.11	306.7	-72.1	481.2	458.3	22.89	21.024		
4,500.0	4,450.6	4,492.6	4,472.6	15.7	11.6	149.70	317.8	-77.1	490.3	466.8	23.50	20.859		
4,600.0	4,549.4	4,592.1	4,571.4	16.1	11.9	149.30	328.9	-82.0	499.4	475.3	24.12	20.703		
4,700.0	4,648.1	4,691.6	4,670.2	16.4	12.2	148.91	340.0	-87.0	508.5	483.8	24.74	20.555		
4,800.0	4,746.9	4,791.1	4,769.0	16.8	12.5	148.54	351.1	-92.0	517.7	492.3	25.36	20.413		
4,900.0	4,845.7	4,890.7	4,867.7	17.2	12.9	148.18	362.2	-96.9	526.8	500.9	25.98	20.278		
5,000.0	4,944.4	4,990.2	4,966.5	17.5	13.2	147.84	373.4	-101.9	536.0	509.4	26.60	20.150		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt 6G-403
Project:	SEC.6-T4N-R66W	TVD Reference:	WELL @ 4737.0ft (RKB - 15')
Reference Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	MD Reference:	WELL @ 4737.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #2 (9-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Bernhardt 4N66W6G Pad Sec.6-T4N-R66W - Bernhardt 6K-443 - Wellbore #1 - Plan #2 (9-3-14)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,043.2	5,089.7	5,065.3	17.9	13.5	147.50	384.5	-106.9	545.2	518.0	27.22	20.027	
5,200.0	5,142.0	5,188.4	5,163.2	18.3	13.8	147.18	395.4	-111.8	554.5	526.6	27.84	19.916	
5,300.0	5,240.7	5,281.9	5,256.3	18.7	14.0	147.08	404.1	-115.7	564.4	536.0	28.35	19.905 SF	
5,400.0	5,339.5	5,375.3	5,349.4	19.0	14.2	147.27	410.0	-118.3	575.4	546.6	28.81	19.972	
5,500.0	5,438.3	5,468.2	5,442.2	19.4	14.3	147.73	413.0	-119.7	587.4	558.2	29.21	20.114	

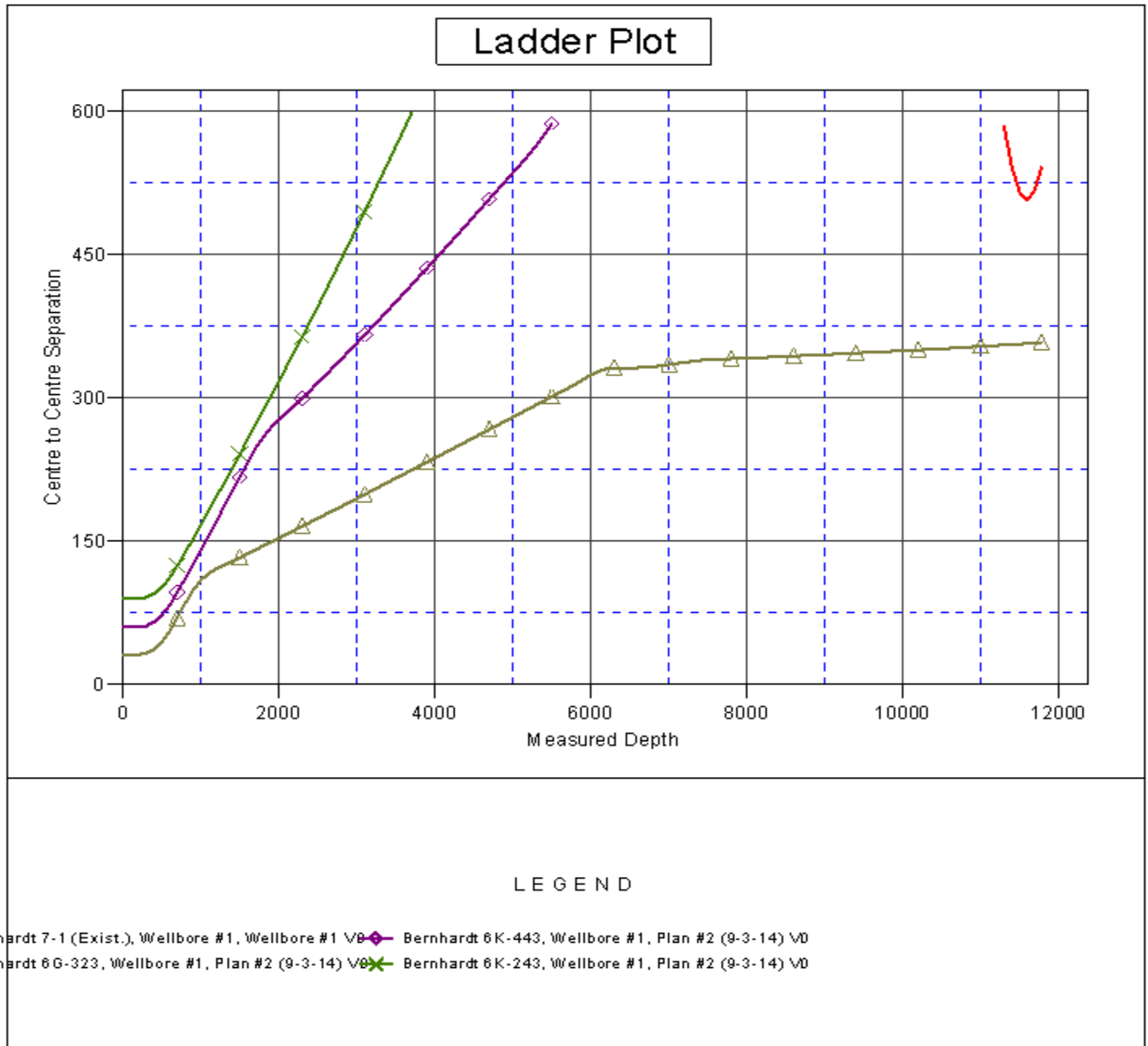
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt 6G-403
Project:	SEC.6-T4N-R66W	TVD Reference:	WELL @ 4737.0ft (RKB - 15')
Reference Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	MD Reference:	WELL @ 4737.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #2 (9-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.6-T4N-R66W - Bernhardt 7-1 (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7310-UNKNOWN													Offset Well Error:	0.0 ft
Reference	Offset	Semi Major Axis		Distance										
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
11,300.0	7,208.0	7,200.0	7,200.0	80.2	144.0	-89.86	-4,251.5	-273.2	584.6	361.2	223.37	2.617		
11,400.0	7,208.4	7,200.4	7,200.4	82.1	144.0	-89.91	-4,251.5	-273.2	542.0	316.7	225.26	2.406		
11,500.0	7,208.8	7,200.8	7,200.8	83.9	144.0	-89.96	-4,251.5	-273.2	515.4	288.3	227.15	2.269		
11,590.3	7,209.2	7,201.2	7,201.2	85.6	144.0	-90.00	-4,251.5	-273.2	507.5	278.6	228.86	2.217 CC		
11,600.0	7,209.2	7,201.2	7,201.2	85.8	144.0	-90.00	-4,251.5	-273.2	507.5	278.5	229.04	2.216 ES, SF		
11,700.0	7,209.7	7,201.7	7,201.7	87.7	144.0	-90.05	-4,251.5	-273.2	519.2	288.2	230.94	2.248		
11,779.7	7,210.0	7,202.0	7,202.0	89.2	144.0	-90.09	-4,251.5	-273.2	541.7	309.2	232.45	2.330		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt 6G-403
Project:	SEC.6-T4N-R66W	TVD Reference:	WELL @ 4737.0ft (RKB - 15')
Reference Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	MD Reference:	WELL @ 4737.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #2 (9-3-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4737.0ft (RKB - 15')
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000 °

Coordinates are relative to: Bernhardt 6G-403
 Coordinate System is US State Plane 1983, Colorado Northern Zone
 Grid Convergence at Surface is: 0.44°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt 6G-403
Project:	SEC.6-T4N-R66W	TVD Reference:	WELL @ 4737.0ft (RKB - 15')
Reference Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	MD Reference:	WELL @ 4737.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt 6G-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #2 (9-3-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4737.0ft (RKB - 15')
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Central Meridian is -105.500000 °

Coordinates are relative to: Bernhardt 6G-403
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.44°

